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10/577,020	02/08/2007	Luca Giannini	07040.0257	5992

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EXAMINER	
FISCHER, JUSTIN R	

ART UNIT	PAPER NUMBER
1791	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,020	GIANNINI ET AL.	
	Examiner	Art Unit	
	Justin R. Fischer	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *52-101* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *52-101* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *042506,100909*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 52-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga (JP 2002-347410) and further in view of Larson (US 2003/0032710).

Matsunaga teaches a tire construction including a carcass structure 6, a belt structure 7, a pair of sidewalls 3, and a tread band 2A. Furthermore, as best depicted in Figure 2, said tire includes a rubber layer 2B (inner tread layer) that can be viewed as the claimed "at least one layer of crosslinked elastomeric material applied in a radially internal position with respect to said tread band". In this instance, inner tread layer 2B is described as having a greater hardness than the overlying outer tread layer 2A.

Matsunaga, however, is silent as to the specific composition used to form said inner tread layer 2B and the associated mechanical properties. Larson, on the other hand, recognizes the inclusion of a layered inorganic material, in an analogous manner to the claimed invention, in a tire tread in order to improve the stiffness/modulus of said tread. As stated above, it is desired for the inner tread layer 2B to demonstrate a high hardness and it is well recognized that hardness and modulus generally have a positive relationship (higher hardness equates to higher modulus). It is emphasized that Larson desires inner tread layer 2B to have high mechanical properties (hardness, modulus,

etc.) and such is accomplished by including the disclosed inorganic material in a basic tire rubber composition.

Additionally, it appears that the claimed mechanical properties are obtained by including such a layered inorganic material in a tire rubber composition (see Tables 1 and 2 in applicant's original disclosure) and as such, inner tread layer 2B of Matsunaga, in view of Larson, would be expected to demonstrate the claimed mechanical properties. Thus, one of ordinary skill in the art at the time of the invention would have been amply motivated to include the disclosed "layered inorganic material" in the "at least one layer of a crosslinked material" (inner tread layer 2B) of Matsunaga and form a layer having the claimed mechanical properties.

As to claims 53-56, the claimed properties appear to necessarily result from including a layered inorganic material in a basic tire rubber composition (see Tables 1 and 2 in applicant's original disclosure). As such, one would have expected the inner tread layer 2B of Matsunaga, in view of Larson, to demonstrate the claimed mechanical properties.

Regarding claims 57-59, the claimed quantitative relationship appears to be a direct result of forming a tire component such that the tire circumferential direction is parallel to the extrusion direction and such would be the case with the circumferentially continuous inner tread layer 2B of Matsunaga (see Page 6, Lines 10+ in applicant's original disclosure).

With respect to claims 60 and 61, the tire of Matsunaga further includes a rubber layer 9 disposed between the carcass and the circumferential belt layer- such a layer

can similarly be viewed as the claimed "at least one layer of a crosslinked material". In this instance, one of ordinary skill in the art at the time of the invention would have found it obvious to include the claimed "at least one layered inorganic material" in order to provide improved stiffness/reinforcement (in view of Larson). It is emphasized that Matsunaga desires the rubber layer 9 to have a greater hardness than the tread band 2A (in an analogous manner to the relationship between the tread band 2A and the inner tread layer 2B) (Paragraph 24). As such, one of ordinary skill in the art at the time of the invention would have been amply motivated to include the claimed inorganic material in the rubber layer of Matsunaga Lastly, rubber layer 9 has a thickness between 0.8 and 3.5 mm, which substantially overlaps the claimed range (Paragraph 23).

As to claims 62 and 63, rubber layer 2B and rubber layer 9 can be separately viewed as the claimed "at least layer or crosslinked elastomeric material".

Regarding claim 64, the claim is directed to a method of forming said layer and such limitations do not further define the structure of the claimed tire article.

With respect to claims 65-67, tire rubber layers are conventionally formed with at least one diene based elastomeric polymer and in view of Larson, one would have found it obvious to include the claimed layered inorganic material having the claimed arrangement (Paragraph 46).

Regarding claims 68 and 69, Larson suggests the claimed loading (Paragraph 21).

As to claims 70 and 71, Larson suggests the specific use of montmorillonite (Paragraph 21).

With respect to claims 72 and 73, the inorganic material/clay of Larson is treated with a quaternary ammonium salt (Paragraphs 24+).

Regarding claims 74-79, the claimed elastomers represent the well known conventional elastomers used in the tire industry, as shown for example by Larson (Column 6, Lines 30-50). It is emphasized that each of the claimed elastomers is extensively used in a wide variety of tire components, including the belt structure. Lastly, the claimed elastomers are recognized as having a glass transition temperature in accordance to the claimed invention.

As to claims 84-87, and 90, silane coupling agents are conventionally used in tire rubber compositions to "couple" or connect silica to a base elastomer component, which ultimately improves the properties of a given tire component. Larson provides one example of such a composition (Paragraphs 50+).

With respect to claims 80-83, 88, and 89, tire compositions are generally described as including a plurality of reinforcing fillers, such as carbon balck, silica, and/or clay materials. In this instance, Larson recognizes the manufacture of tire rubber layers comprising each of the aforementioned reinforcing fillers (Paragraph 53).

3. Claims 91-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga and Larson as applied in claim 52 above and further in view of Kawajiri (JP 60166506). As detailed above, Matsunaga is directed to a motorcycle tire having an outer, ground contacting tread layer 2A and an inner tread layer 2B, wherein said inner

tread layer has a greater modulus and hardness, as compared to said outer tread layer. Additionally, in view of Larson, one would have been amply motivated to include an inorganic layered material in the inner tread layer of Matsunaga to obtain the aforementioned mechanical properties. In this instance, however, the references are silent with respect to the mechanical properties of the outer ground contacting tread layer 2A. In any event, the claimed values are consistent with compositions used to form outer tread rubber layers in motorcycle tires having multi-layered tread arrangements, as shown for example by Kawajiri (Abstract). It is emphasized that the general disclosure of Kawajiri suggests an outer tread rubber having a modulus less than approximately 20 MPa and such encompasses a plurality of embodiments that satisfy the claimed invention (independent of the temperature at which the modulus is measured- assumed to be room temperature absent any express disclosure of temperature).

As to claims 95-98, one would have readily appreciated the wide range of rubber compositions given the general disclosure of Kawajiri noted above. It is particularly noted that claim 95 essentially describes the entire range of possible values for the loss tangent and as such, one would have expected the loss tangent of outer tread layer 2A to satisfy the claimed invention. Additionally, the loss tangent, in an analogous manner to the claimed invention, would be expected to decrease with an increase in temperature in accordance to the claimed invention.

4. Claims 52-62 and 64-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (US 5,226,987) and further in view of Larson. Matsumoto

teaches a tire construction including a carcass 4, a belt 2, a tread band 1, a pair of sidewalls 5, and at least one layer crosslinked elastomeric material 3. The reference further teaches that layer 3 can have a high dynamic modulus and contribute to cut resistance and furthermore, said layer can include conventional additives, such as reinforcers, to obtain the above mentioned properties (Column 2, Lines 33-51 and Column 4, Lines 1-5). In this instance, though, Matsumoto is completely silent with respect to specific types of reinforcers.

Larson, on the other hand, recognizes the known inclusion of an inorganic clay material (reinforcer) in a tire rubber composition to obtain a high modulus/stiffness (Paragraphs 40 and 80). One of ordinary skill in the art at the time of the invention would have found it obvious to include such an inorganic material in the rubber layer 3 of Matsumoto since Matsumoto expressly teaches a high modulus material formed by including known additives or reinforcers and the disclosed inorganic material is recognized as such in the tire industry.

Lastly, regarding the independent claim, it appears that the claimed mechanical properties are obtained by including such a layered inorganic material in a tire rubber composition (see Tables 1 and 2 in applicant's original disclosure) and as such, rubber layer 3 of Matsumoto, in view of Larson, would be expected to demonstrate the claimed mechanical properties. It is additionally noted that Matsumoto is directed to a rubber composition that can have a relatively high dynamic modulus (see relationship detailed in Column 2, Lines 61+) and such is consistent with the broad range of the claimed invention. For example, given a thickness of 0.5 mm, said rubber layer can have a

dynamic modulus at 30°C as high as 65 MPa and such would not be expected to fall below 20 MPa at 70°C.

As to claims 53-56, the claimed properties appear to necessarily result from including a layered inorganic material in a basic tire rubber composition (see Tables 1 and 2 in applicant's original disclosure). As such, one would have expected the rubber layer 3 of Matsumoto, in view of Larson, to demonstrate the claimed mechanical properties.

Regarding claims 57-59, the claimed quantitative relationship appears to be a direct result of forming a tire component such that the tire circumferential direction is parallel to the extrusion direction and such would be the case with the circumferentially continuous rubber layer 3 of Matsumoto (see Page 6, Lines 10+ in applicant's original disclosure).

With respect to claims 60 and 61, the disclosed thickness values are consistent with those exemplified in Matsumoto (Table 2).

Regarding claim 64, the claim is directed to a method of forming said layer and such limitations do not further define the structure of the claimed tire article.

With respect to claims 65-67, tire rubber layers are conventionally formed with at least one diene based elastomeric polymer and in view of Larson, one would have found it obvious to include the claimed layered inorganic material having the claimed arrangement (Paragraph 46). Also, see Table 1 of Matsumoto.

Regarding claims 68 and 69, Larson suggests the claimed loading (Paragraph 21).

As to claims 70 and 71, Larson suggests the specific use of montmorillonite (Paragraph 21).

With respect to claims 72 and 73, the inorganic material/clay of Larson is treated with a quaternary ammonium salt (Paragraphs 24+).

Regarding claims 74-79, the claimed elastomers represent the well known conventional elastomers used in the tire industry, as shown for example by Larson (Column 6, Lines 30-50). It is emphasized that each of the claimed elastomers is extensively used in a wide variety of tire components, including the belt structure. Lastly, the claimed elastomers are recognized as having a glass transition temperature in accordance to the claimed invention. Additionally, see Table 1 of Matsumoto.

As to claims 84-87, and 90, silane coupling agents are conventionally used in tire rubber compositions to "couple" or connect silica to a base elastomer component, which ultimately improves the properties of a given tire component. Larson provides one example of such a composition (Paragraphs 50+).

With respect to claims 80-83, 88, and 89, tire compositions are generally described as including a plurality of reinforcing fillers, such as carbon balck, silica, and/or clay materials (see Table 1 of Matsumoto). In this instance, Larson recognizes the manufacture of tire rubber layers comprising each of the aforementioned reinforcing fillers (Paragraph 53).

5. Claims 91-101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto and Larson as applied in claim 52 above and further in view of Matsue (US 5,420,193). As detailed above, Matsumoto is directed to a heavy duty tire assembly

including a rubber reinforcing layer 3 that contributes to cut resistance and low heat generation (Abstract and Column 2, Lines 33+). The reference, however, is completely silent with respect to the composition of the tread 1.

Matsue, on the other hand, is similarly directed to a heavy duty tire construction and teaches the use of a tread composition having specific mechanical properties in order to optimize cut resistance and heat generation. More particularly, the tread of Matsue has a hardness between 60 and 95 at 25°C and a loss tangent between 0 and 0.3 at 100°C (Column 3, Line 35–Column 4, Line 10). It is emphasized that Matsue specifically suggests the benefits of cut resistance and low heat generation and such is directly analogous to the benefits desired in the tire of Matsumoto. As such, one would have been amply motivated to form the tread of Matsumoto with a hardness and loss tangent in accordance to the claimed invention (in view of Matsue).

With respect to claims 97, 98, and 101, the mechanical properties of Matsue would similarly be expected to decrease as a function of increasing temperature.

Also, as to claims 91-94, the disclosed modulus values are consistent with those commonly used in treads of pneumatic tire constructions, Additionally, as detailed above, the hardness and loss tangent disclosed by Matsue substantially overlap the values of the claimed invention and as such, one would have expected an additional mechanical property (modulus) to be extremely similar to that of the claimed invention. It is emphasized that the mechanical properties detailed in claims 91-94 appear to be consistent with tread rubber compositions used in modern day tire constructions and it is well recognized that such properties decrease with increasing temperature.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R. Fischer** whose telephone number is **(571) 272-1215**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Justin Fischer
/Justin R Fischer/
Primary Examiner, Art Unit 1791
January 20, 2010